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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/713,353	11/17/2003	Sung-mun Cho	45686	9153

1609 7590 08/31/2006

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EXAMINER

GRANT, ROBERT J

ART UNIT	PAPER NUMBER
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2838

DATE MAILED: 08/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/713,353

Applicant(s)

CHO, SUNG-MUN

Examiner

Robert Grant

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 14 March 2006.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-22 and 35 is/are rejected.
- 7) ☒ Claim(s) 23-34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 March 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 2-21-06.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6-10, and 12-13 are rejected under 35 U.S.C. 102(b) as being anticipated by Matsuda et al. (US 5,739,667).

As to Claim 1, Matsuda discloses a digital device capable of recharging a rechargeable battery comprising; a consuming current detect unit for detecting a consuming current input to the digital device (Figure 1, element 11); a control unit for generating a control signal based on the consuming current and a battery recharging current (element 16); a recharging current detect unit for detecting the battery recharging current as the battery is recharged (element 10); and a recharging control unit for regulating the consuming current to the rechargeable battery in proportion to the control signal output from the control unit and the battery recharging current detected by the recharging current detect control unit (element 4, 16, and 56).

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As to Claim 2, which is dependent upon claim 1, Matsuda discloses wherein the control signal includes a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 3, which is dependent upon claim 2, Matsuda discloses wherein the pulse width modulation control signal has a duty ratio adjusted according to the consuming current detected by the consuming current detect unit (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 4, which is dependent upon claim 1, Matsuda discloses wherein the consuming current detect unit comprises (element 11): a first current detecting resistor for detecting the consuming current (Figure 4, element R6) ; and a first operational amplifier, wherein a first end of the first current detecting resistor is coupled to an inverting input of the first operational amplifier and the second end of the first current detecting resistor is coupled to the non-inverting input of the first operational amplifier (Figure 4, element ERR2- and EER 2+).

As to Claim 6, which is dependent upon claim 1, Matsuda further discloses wherein the recharging control unit comprises: an integrator (element 31), an input of which is coupled to a first output of the control unit (Figure 4, element 56); a third operational amplifier (element 32); a fourth current detecting resistor (Inside element 54); and a transistor (Element Tr1), wherein a first output of the integrator is coupled to a non-

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inverting input of the third operational amplifier, an inverting input of the third operational amplifier is coupled to an output of the recharging current detect unit (Column 8, lines 35-49), a first end of the fourth current detecting resistor is coupled to an output of the third operational amplifier and a second end of the fourth current detecting resistor is coupled to a first input of the transistor (Element 54), a second input of the transistor is coupled to a power source (element 51), and an output of the transistor is coupled to a positive terminal of the rechargeable battery (Element 3).

As to Claim 7, which is dependent upon claim 1, Matsuda discloses wherein the control unit includes a microprocessor (Figure 4, element 56).

As to Claim 8, Matsuda discloses a method for controlling recharging current of a rechargeable battery used in a digital device to recharge current of a rechargeable battery comprising: detecting a consuming current input to the digital device (Figure 1, element 11); detecting a battery recharging current as the battery is recharged (Element 10); generating a control signal based on said detected consuming current and said detected battery recharging current (Element 16); and regulating the recharging current to the rechargeable battery in proportion to the control signal and the detected battery recharging current (Elements 4 and 16)

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As to Claim 9, which is dependent upon claim 8, Matsuda discloses wherein the control signal is a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 10, which is dependent upon claim 8, Matsuda discloses adjusting the control signal according to the detected consuming current (Column 16, lines 66-67, and column 17, lines 1-7).

As to Claim 12, which is dependent upon claim 10, Matsuda further discloses wherein the step of adjusting the control signal according to the detected consuming current comprises (Figure 1): determining whether the magnitude of the consuming current increases or decreases (element 13); and varying the control signal in accordance with the increase or decrease of the magnitude of the consuming current (element 16).

As to Claim 13, which is dependent upon claim 9, Matsuda the device further comprising: outputting a control signal according to a magnitude of the consuming current (element 16).

As to claim 35, which is dependent upon claim 12, Matsuda discloses wherein the control signal is a pulse width modulation signal and the step of varying the control signal comprises varying the duty cycle of the pulse width modulation signal (column 11, lines 18-20).

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Hasegawa (US 5,545,969).

5. As to Claim 5, Matsuda discloses all the limitations of claim 1, but does not expressly disclose the limitations of the claim at hand. Hasegawa discloses the digital device capable of recharging a rechargeable battery according to claim 1, wherein the recharging current detect unit comprises (figure 1): a second current detecting resistor (element 2); a third current detecting resistor for detecting the rechargeable battery recharging current (resistor connected to – terminal of element 31); and a second operational amplifier (element 31), wherein a first end of the second current detecting resistor is coupled to a non-inverting input of the second operational amplifier and to the negative terminal of the rechargeable battery (3<sup>rd</sup> node off of the – terminal of battery 13 connecting down to element 31), and a first end of the third current detecting resistor is coupled to an inverting input of the third operational amplifier, and further wherein the second end of the second and third current detecting resistors are coupled together to

earth ground (Negative terminal of element 13). It would have been obvious to a person having ordinary skill in the art at the time of this invention to use the device of Hasewaga in order to measure the voltage being used to recharge the battery, in order to determine if the system is working as efficiently as it is capable.

6. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Lefevre et al. (US 6,429,625).

As to Claim 11, Matsuda discloses all the limitation of the independent claim 8, but does not expressly disclose displaying a recharge complete message. Lefevre discloses an electronic device which displaying a recharging complete message if the recharging current equals a predetermined value (Column 4, lines 66-67 and Column 5, lines 1-5). It would have been obvious to one of ordinary skill in the art at the time of this invention to include a recharge complete message in order to notify the user of the full charge status of the battery.

7. Claims 14-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in view of Lee (US 5,900,717).

As to Claim 14, Matsuda discloses all the limitations of claim 13, Matsuda does disclose using a pulse width modulation duty cycle to control the charging of the battery. Matsuda does not expressly disclose a charging current routine. Lee



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discloses maintaining a first constant current for a first range of current values (Column 1, lines 65-67); maintaining a second constant current for a second range of consuming values (Column 1, lines 57-61); maintaining a third constant current for a third range of current values (Column 1, lines 61-65). The pulse width modulation of Matsuda would be used with the charging routine of Lee, and therefore moving from one current value to another would cause a linear adjustment in the duty cycle. It would have been obvious to one ordinary skill in the art at the time of this invention to combine the charging modes of Lee with the charger of Matsuda in order to rapidly and efficiently charge the battery.

As to Claim 15, which is dependent upon claim 14, Matsuda in view of Lee disclose the claimed invention except for wherein the first constant is in the range of about 50 to about 60 percent duty cycle. The examiner takes official notice that duty cycle times adjust the average value of the DC voltage output of a component, and the desired output value is reached through the adjustment of the duty cycle (Erickson Chapter 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the duty cycle according to the desired output current, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

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As to Claim 16, which is dependent upon claim 14, Matsuda in view of Lee disclose the claimed invention except for wherein the second constant is in the range of about 20 to about 30 percent duty cycle. The examiner takes official notice that duty cycle times adjust the average value of the DC voltage output of a component, and the desired output value is reached through the adjustment of the duty cycle (Erickson Chapter 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the duty cycle according to the desired output current, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 17, which is dependent upon claim 14, Lee discloses the claimed invention wherein the first range of consuming current values is in the range of at or about 0 milliamps to at or about 275 milliamps (Column 1, lines 65-67). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 18, which is dependent upon claim 14, Lee discloses the claimed invention wherein the second range of consuming current values is in the range of about 950

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milliamps to about 1200 milliamps (Column 1, lines 57-61). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

As to Claim 19, which is dependent upon claim 14, Lee discloses the claimed invention wherein the third range of consuming current values is in the range of about 275 milliamps to about 950 milliamps (Column 1, lines 61-65). It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the range of the charging current to get the desired charge characteristic, since it has been held that where general conditions of a claim are disclosed in prior art, discovering the optimum or working range involves only routine skill in the art. In re Aller, 105 USPQ 233.

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hutchison, IV et al. (US 6,118,250).

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As to Claim 20, Hutchison discloses a method for recharging a rechargeable battery in a digital device comprising: determining whether a voltage of a rechargeable battery is greater than a voltage, and if so, determining that the battery is partially discharged and performing a recharge operation according to the state of the digital device being used (Column 3, lines 6-12). Hutchison discloses the claimed invention except for the voltage being 5 volts. It would have been obvious to one having ordinary skill in the art at the time this invention was made to set the voltage at 5 volts, since it has been held that discovering an optimum value involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

9. Claims 21 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hutchison, IV et al. in view of Matsuda et al..

As to Claim 21, which is dependent upon claim 20, Hutchinson discloses all the limitation of the independent claim, but does not expressly disclose the limitations of claim 21. Matsuda discloses the step of performing a recharge operation according to a state of the digital device being used comprises; determining a consuming current (Figure 1, element 11); outputting a control signal according to the consuming current (element 16); and supplying a recharging current according to the control signal to the rechargeable battery for recharging (Column 16, lines 66-67, and column 17, lines 1-

7)(Being that there is only one power source, when Tr1 is switched on, it takes power that would have been supplied to the load).

As to Claim 22, which is dependent upon claim 21, Matsuda discloses wherein the control signal includes a pulse width modulation signal (Column 16, lines 66-67, and column 17, lines 1-7).

***Allowable Subject Matter***

10. Claims 23-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: Claim 23 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery, determining whether the charging current is between 1000 and 300 milliamps, and determining if the recharging current reaches 300 milliamps with in 12 hours, and if so, switch to a second recharge mode. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

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12. The following is a statement of reasons for the indication of allowable subject matter: Claim 24 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery at a charging current of less than or equal to 300 milliamps for substantially one hour, and illuminating an illumination device for substantially for one hour, and continuously after the first time period has expired. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so..

13. The following is a statement of reasons for the indication of allowable subject matter: Claim 25 recites, inter alia, supplying a portion of the consuming current to a rechargeable battery, determining whether the charging current does not reach 300 milliamps within 12 hours, and check to see if the battery voltage is greater than 7 volts. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

14. The following is a statement of reasons for the indication of allowable subject matter: Claim 27 recites, inter alia, determining if the battery voltage is less than or equal to 5 volts, charge the battery for approximately 2 seconds at about 80 milliamps, determine if the battery is now above 5 volts, and if so perform a quick charge, if not perform a trickle charge. The art of record does not disclose, teach, or suggest the above limitations, nor would it have been obvious to modify the art of record to do so.

### ***Response to Arguments***

15. Applicant's arguments filed 3-14-06 have been fully considered but they are not persuasive.

The Amendments to claims 1 and 8 do not over come the prior art used in the rejection. The examiner would like to note, that in the office action is directed towards figure 1, not figure 2 as stated in the arguments. The amendment "generating a control signal based on the consuming current and the battery recharging current", is disclosed in the Matsuda reference. As seen in Column 6, lines 53-55, Element 10 of figure 1 detects the current flowing into the rechargeable battery. Column 6, lines 55-57 discloses that element 11 detects the current consumed by the load device. Column 7, lines 6-7, disclose that element 16 is the control for controlling the charging current.

As to the arguments surrounding claim 20, the examiner does not find these arguments persuasive. As can be further read in column 3, lines 12-16, the charging of the battery does involve the state of the digital device. As can also be further seen in Table 1.

### ***Conclusion***

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert Grant whose telephone number is 571-272-2727. The examiner can normally be reached on M-F 8:30-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Sherry can be reached on 571-272-2084. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RG



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